

SPECIFICATION

PRODUCT NO. : TCXD121IBLON-22

VERSION : Ver 1.0

ISSUED DATE : 2023-08-29

This module is RoHS compliant

FOR CUSTOMER: _____

☐: APPROVAL FOR SPECIFICATION

☒: APPROVAL FOR SAMPLE

DATE	APPROVED BY

Xinli Optoelectronics :

Presented by	Reviewed by	Organized by

Note:

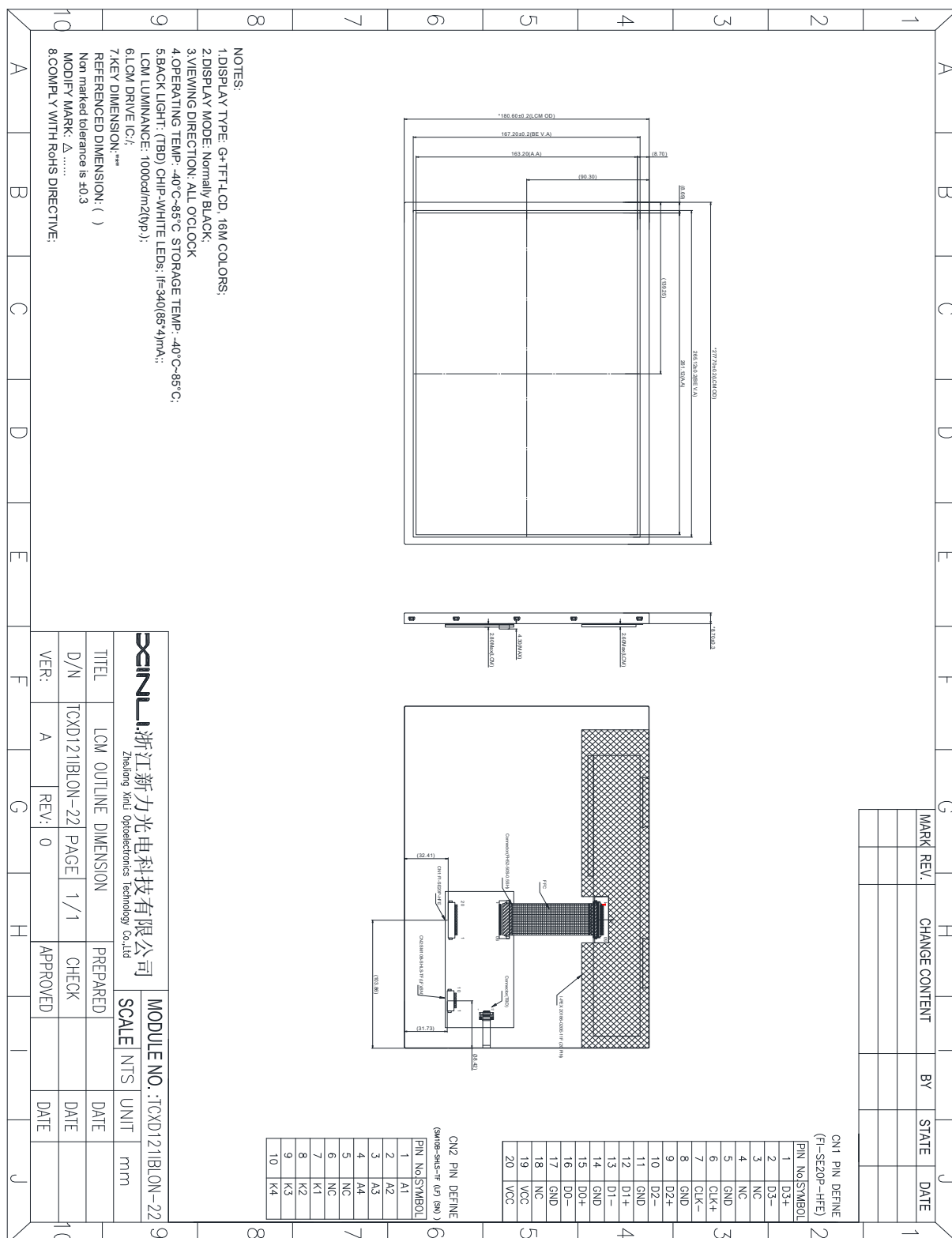
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2. General Description and Features

The 12.1 inch Module named TCXD121IBLON-22 is a-Si TFT-LCD module, which is the type of transmissive. It is consisted of TFT-LCD Panel, one Driver IC ,one FPC and one Back-Light unit. Features of this product are listed in the following table.

NO	Item	Contents	Unit
(1)	Module Outsize	277.7(H)*180.6(V)*8.7(T)	mm
(2)	LCD Active area	261.12(H)*163.2(V)	mm
(3)	Dot Number	1280 RGB (H) x 800 (V)	/
(4)	Pixel size	0.204(H)*0.204(V)	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	16M	/
(7)	Viewing direction	ALL	O'clock
(8)	Backlight Type	TBD	/
(9)	Power Supply	3.3(TYP)	V
(10)	Drive IC	/	/
(11)	Interface type	LVDS	/
(12)	Module weight	TBD	G

3.Mechanical Dimension



4.Interface Pin Connection

FPC Connector is used for the module electronics interface.

CN1 socket (LCD module side): FI-SE20P-HFE (Japan Aviation Electronics Industry Limited (JAE)) Adaptable plug: FI-S20S (Japan Aviation Electronics Industry Limited (JAE)) or equivalent.

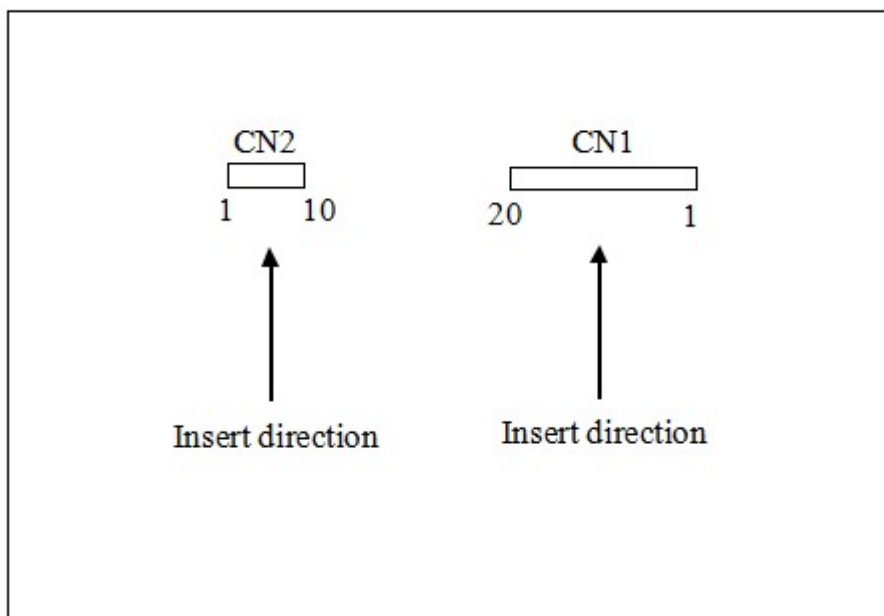
NO	Symbol	Level	Description
1	D3+	I	Pixel data
2	D3-	I	Pixel data
3	NC	-	-
4	NC	-	-
5	GND	P	Ground
6	CLK+	I	Pixel clock
7	CLK-	I	Pixel clock
8	GND	P	Ground
9	D2+	I	Pixel data
10	D2-	I	Pixel data
11	GND	P	Ground
12	D1+	I	Pixel data
13	D1-	I	Pixel data
14	GND	P	Ground
15	D0+	I	Pixel data
16	D0-	I	Pixel data
17	GND	P	Ground
18	NC	-	-
19	VCC	P	Power supply
20	VCC	P	Power supply

CN2 socket (LCD module side): SM10B-SHLS-TF (LF) (SN) (J.S.T. Mfg. Co., Ltd.)

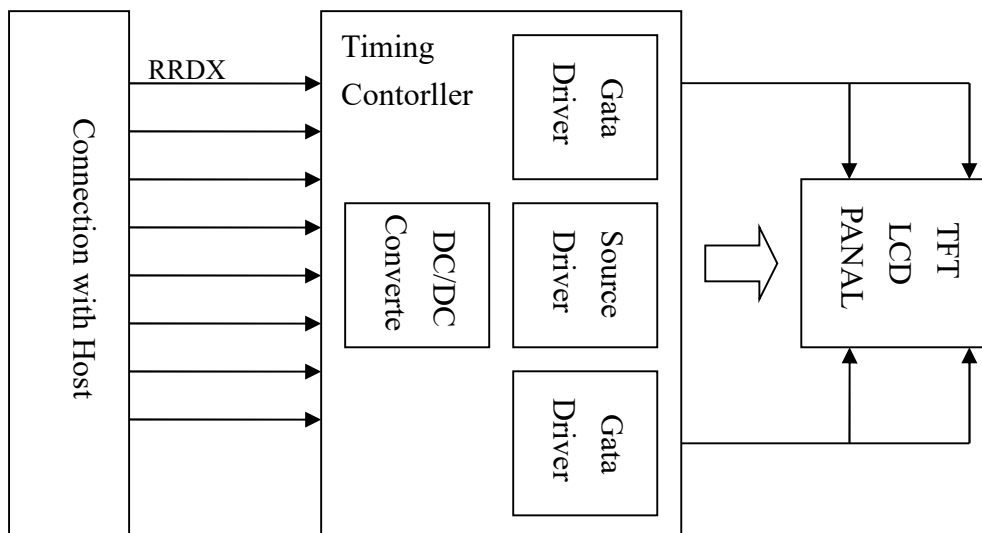
Adaptable plug: SHLP-10V-S-B (J.S.T. Mfg. Co., Ltd.)

NO	Symbol	Level	Description
1	A	P	Anode
2	A	P	Anode
3	A	P	Anode
4	A	P	Anode
5	NC	-	NC
6	NC	-	NC
7	K1	P	Cathode 1
8	K2	P	Cathode 2
9	K3	P	Cathode 3
10	K4	P	Cathode 4

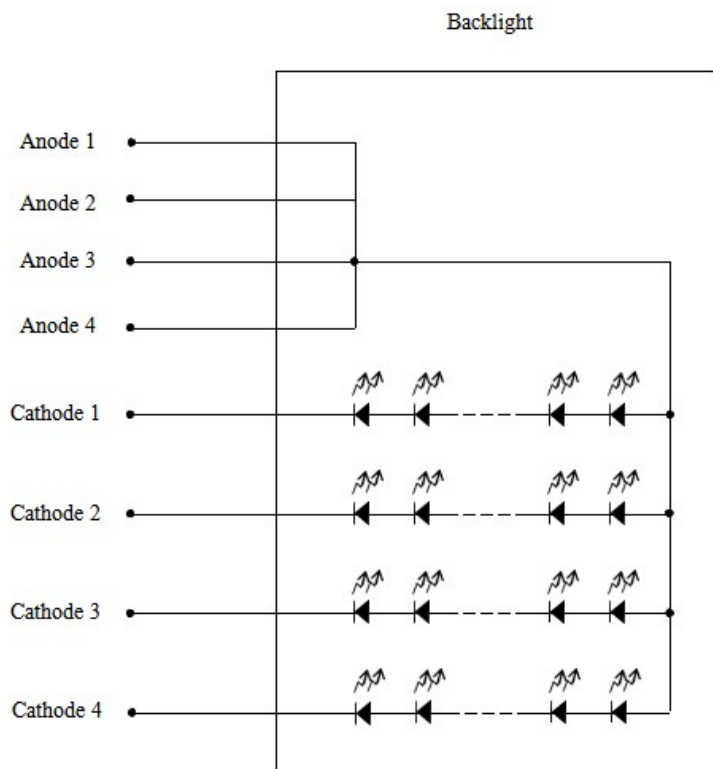
Rear side



5. Block Diagram



Backlight detail:



6. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature	Top	-40 - 85	°C
Storage temperature	Tst	-40 - 95	°C
power supply	VDD	-0.3-5.0	V

NOTE:

If the module was used these absolute maximum ratings as above, it may be damaged permanently. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability. VDD>GND must be maintained.

7. Electrical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Power supply		VDD	-	3	3.3	3.6	V
Logic input signal Voltage	H level	V _{IH}	-	0.8*VCC	-	VCC	V
	L level	V _{IL}		0	-	0.2*VCC	V

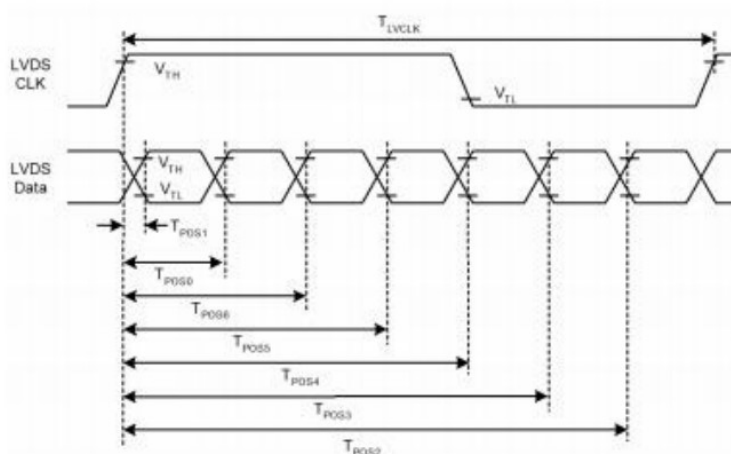
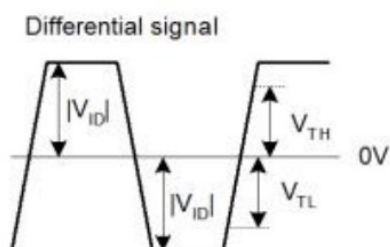
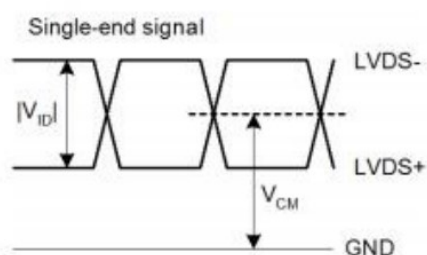
8. Backlight Characteristics

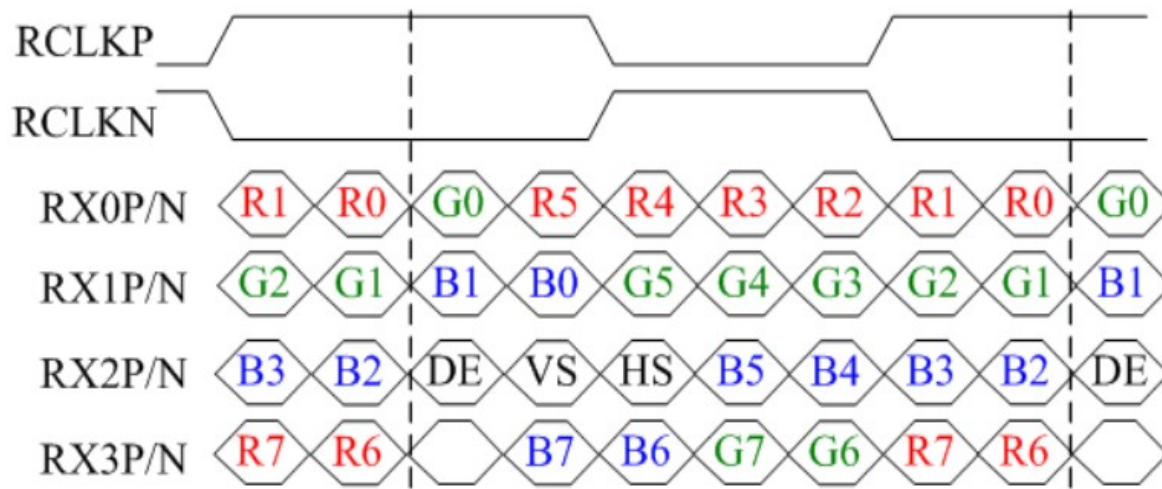
Item	syb	Min	Typ	Max	Unit	Condition
Voltage	Vf	26.2	29.2	33.2	V	IF=340 (85*4)mA
Number of LED	-	36PCS(4P9S)			pcs	-
Power Consumption	PWF	-	9928	-	mW	-
LED life-span	-	-	(50000)	-	Hrs	-

9. Timing Characteristics

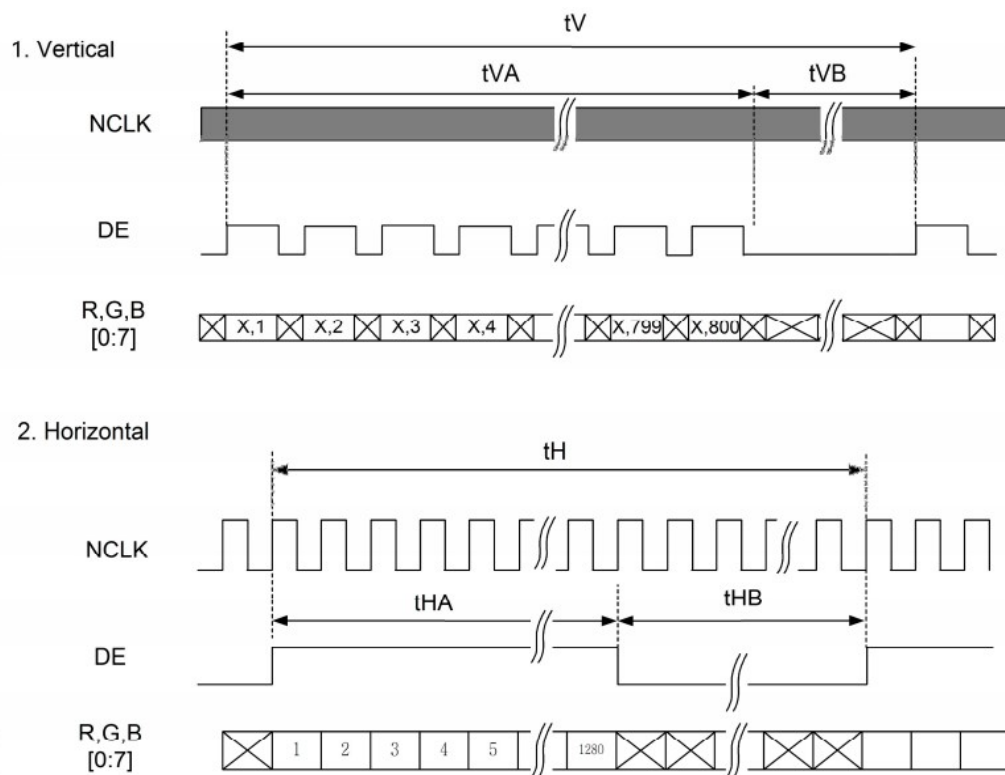
9.1 Switching Characteristics for LVDS Receiver

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	V_{TH}	-	-	200	mV	
Differential Input Low Threshold	V_{TL}	-200	-	-	mV	
Differential input common mode voltage	V_{CM}	1.0	1.2	$1.7 - V_{ID} /2$	V	
Input leakage current	I_{IN}	-10	-	10	uA	RX+/-, RXC+/-
Differential input Voltage	$ V_{ID} $	200	-	600	mV	
1 data bit time	UI	-	1/7	-	T_{LVCLK}	
Position 1	T_{POS1}	-0.25	0	0.25	UI	
Position 0	T_{POS0}	0.75	1	1.25	UI	
Position 6	T_{POS6}	1.75	2	2.25	UI	
Position 5	T_{POS5}	2.75	3	3.25	UI	
Position 4	T_{POS4}	3.75	4	4.25	UI	
Position 3	T_{POS3}	4.75	5	5.25	UI	
Position 2	T_{POS2}	5.75	6	6.25	UI	



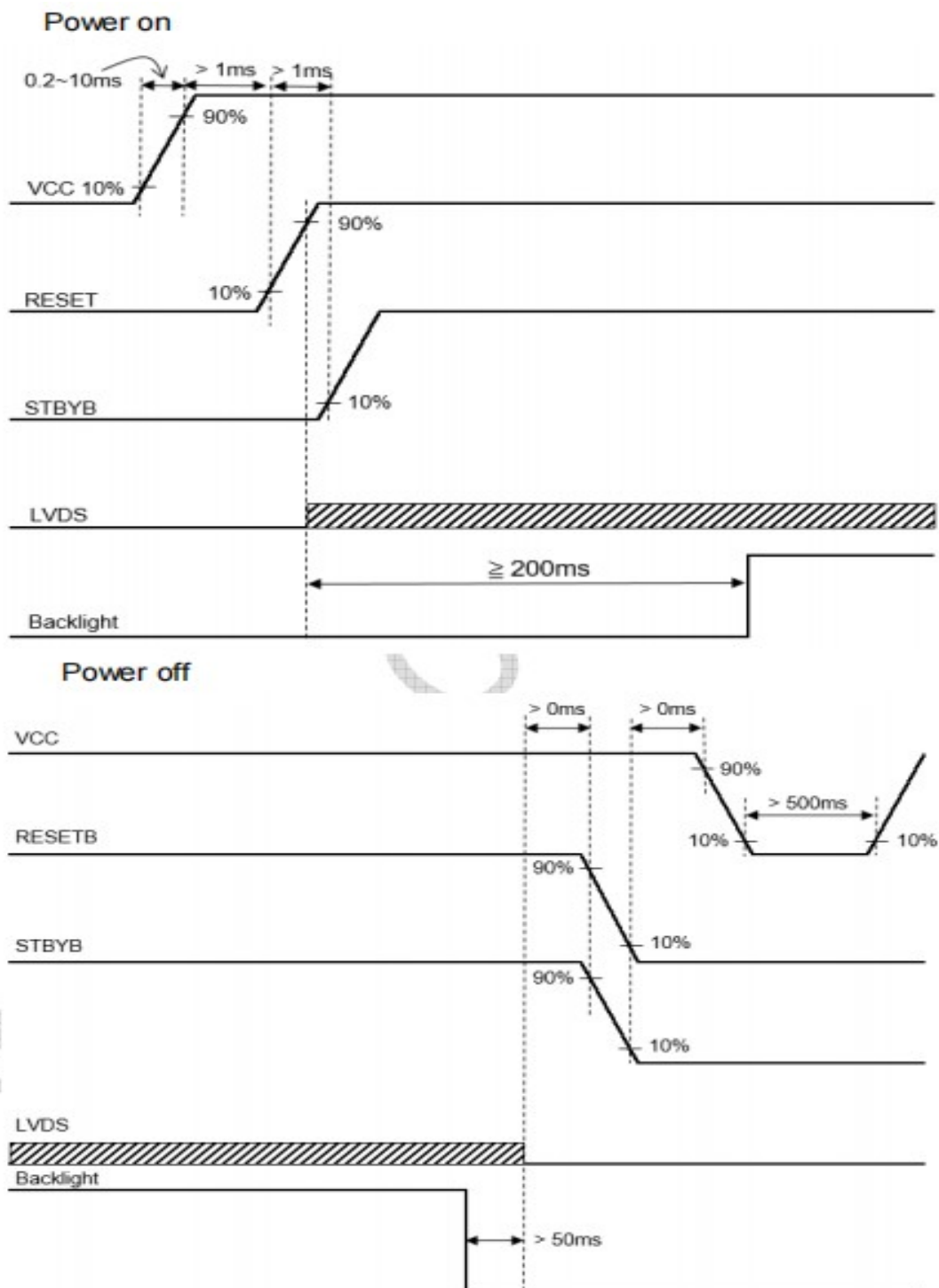
9.2.Bit LVDS input**8-bit LVDS format (VESA)****9.3.Interface Timing (DE mode only)**

Item	Symbol	Min.	Typ.	Max.	Unit
Frame Rate	--	60			Hz
Horizontal Display Time	t _{HA}	1280			clock
Horizontal Blanking Time	t _{HB}	70	80	90	clock
Horizontal Total Time	t _H	1350	1360	1370	clock
Vertical Display Time	t _{VA}	800			line
Vertical Blanking Time	t _{VB}	15	30	45	line
Vertical Total Time	t _V	815	830	845	line
Clock Rate	1/ T _{Clock}	66.015	67.728	69.459	MHz



Note 1 : All timing parameters should be constant in each frame

9.4. Power On / Off Sequence



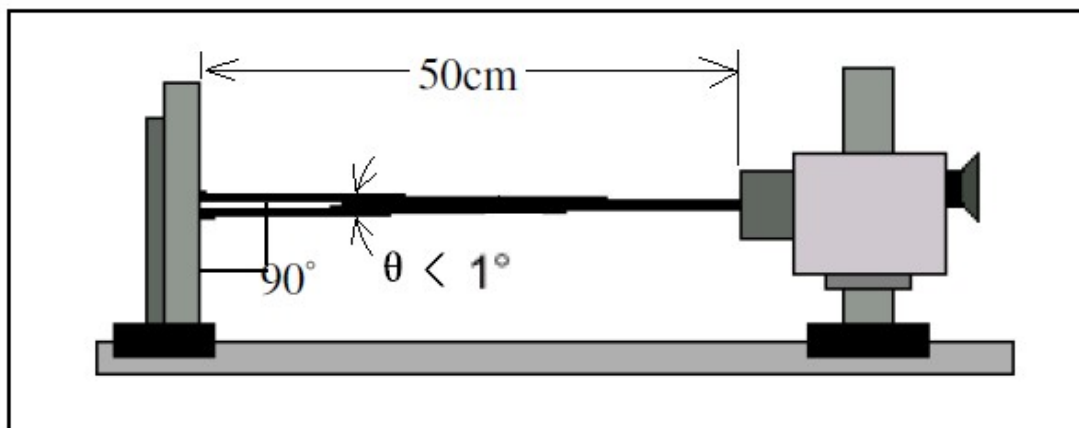
10. Electro-Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Response time		Tr+Tf	$\theta = 0$	-	-	30	ms	4
Uniformity (Five point)		δ WHITE	$\theta = 0$ Ta=25℃	-	70	-	%	7
Contrast ratio		Cr		800	1000	-	-	3,5
Surface Luminance		Lv		800	1000	-	-	3,7
Viewing angle range	Hor.	ΘL	CR>10	80	88	-	deg	6
		ΘR		80	88	-	deg	
	Ver.	ΘU		80	88	-	deg	
		ΘD		80	88	-	deg	
Color filter chromaticity (x, y)	White	X	$\theta = \phi = 0^\circ$	TBD	TBD	TBD	-	7
		Y		TBD	TBD	TBD		
	Red	X	$\theta = \phi = 0^\circ$	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
	Green	X	$\theta = \phi = 0^\circ$	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
	Blue	X	$\theta = \phi = 0^\circ$	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		

Note 1: Ambient temperature=25℃±2℃

Note 2: To be measured in the dark room with backlight unit.

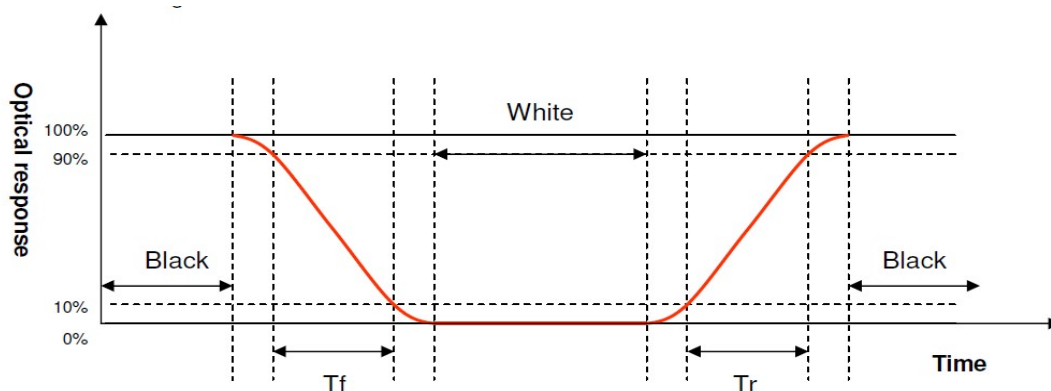
Note 3: To be measured at the center area of panel with a viewing cone of 1 by Topcon luminance meter BM-7A, after 10 minutes operation (module).



Note 4: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from “black” to “white” (rising time) and from “white” to “black” (falling time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes.

Refer to figure as below.



Note 5. Definition of contrast ratio:

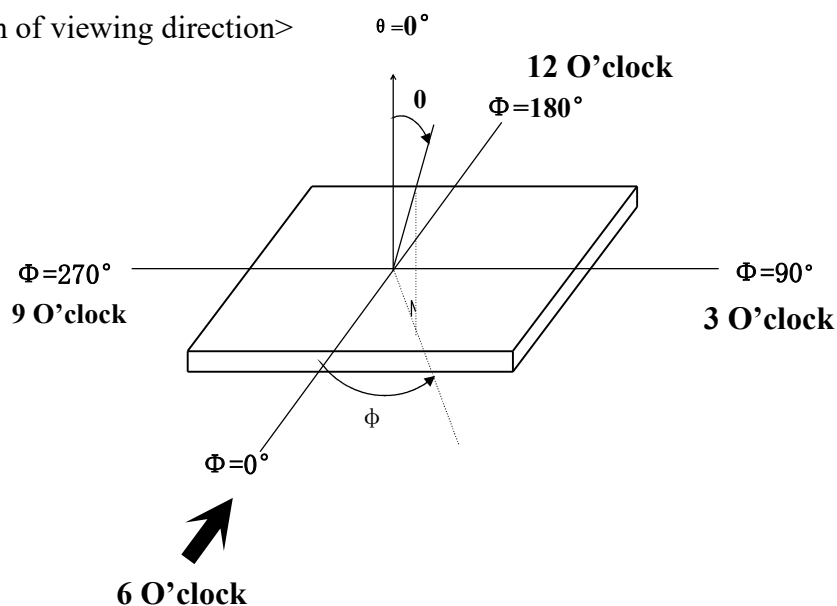
Contrast ratio is calculated with the following formula:

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

Note 6. Definition of viewing angle

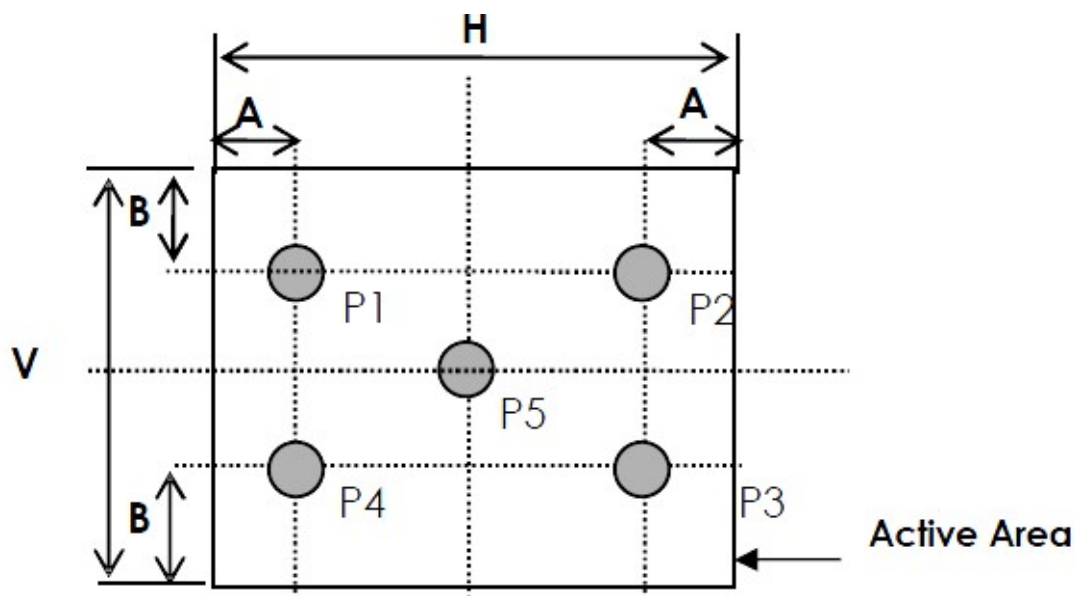
Viewing angle is the angle at which the contrast ratio is greater than 2, for TFT module the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

<Definition of viewing direction>



Note 7. Surface luminance is the LCD surface from the surface with all pixels displaying white. Refer to figure as below.

Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity



$A : 5 \text{ mm}$ $B : 5 \text{ mm}$ $H, V : \text{Active Area}$

Light spot size $\varnothing = 7 \text{ mm}$, 500mm distance from the LCD surface to detector lens

measurement instrument is TOPCON' s luminance meter BM-7A

Uniformity definition= [min of 5point/max of 5points]x100%

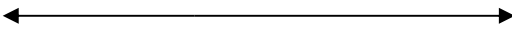
L_v = Surface Luminance with all white pixels (P_5)

11. Quality Assurance

TBD.

12. Reliability Test

This standard reliability test is done only for the first lot of MP products. Customer and supplier must hold a discussion if other reliability test is requested by customer.

N O.	Test Item	Description	Test Condition
1	High temperature storage	Endurance test applying the high storage temperature for a long time	85°C, 500 H
2	Low temperature storage	Endurance test applying the low storage temperature for a long time	-40°C, 500 H
3	High temperature operation	Endurance test applying the electric stress under high temperature for a long time	85°C, 500 H
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time	-40°C, 500 H
5	High temperature /humidity storage	Endurance test applying the high temperature and high humidity storage for a long time	60°C, 90% RH, 500H
6	Temperature Cycle	Endurance test applying the low and high temperature cycle -30°C ← → 25°C ← → 80°C 30min ← → 5min ← → 30min  one cycle	-30°C/80°C, 100 cycles
7	ESD Test	To check the product operating capability after electrostatic environment.	Voltage: ± 4KV(contact discharge); ±8 KV(air discharge) C:330PF;R:330 Ω

13. Precautions for Operation and Storage

1. Precautions for Operation

- (1) Since LCD panel made of glass, in order to prevent from glass broken or color tone change, please do not apply any mechanical shock or impact or excessive force to it when installing the LCD module.
- (2) If LCD panel is broken and liquid crystal substance leaks out and contact your skin or clothes, please immediately wash it off by using soap and water.
- (3) The polarizer on the LCD surface is soft and easily scratched. Please be careful when handling.
- (4) If LCD surface becomes contaminated, please wipe it off gently by using moist soft cloth with normal hexane, do not use acetone, ketone, ethanol, alcohol or water. If there is saliva or water on the LCD surface, please wipe it off immediately.
- (5) When handling LCD module, please be sure that the body and the tools are properly grounded. And do not touch I/F pins with bare hands or contaminate I/F pins.
- (6) Do not attempt to disassemble or process the LCD module.
- (7) LCD module should be used under recommended operating conditions shown in chapter 6 and 7.
- (8) Response time will be extremely slower at lower temperature than at specified temperature and LCD will show different color when at higher temperature. The phenomenon will disappear when returning to specified condition.
- (9) Foggy dew, moisture condensation or water droplets deposited on surface and contact terminals will cause polarizer stain or damage, the deteriorated display quality and electrochemical reaction then leads to the shorter life time and permanent damage to the module probably. Please pay attention to the environmental temperature and humidity.

2. Precautions for Storage

- (1) Please store LCD module in a dark place, avoid exposure to sunlight, the light of fluorescent lamp or any ultraviolet ray.
- (2) Keep the environment temperature at between 10°C and 35 °C and at normal humidity. Avoid high temperature, high humidity or temperature below 0°C.
- (3) That keeps the LCD modules stored in the container shipped from supplier before using them is recommended.

(4) Do not leave any article on the LCD module surface for an extended period of time.

3. Warranty period

Warrants for a period of 12 Months from the shipping date when stored or used under normal condition.

14. Package Specification

TBD.